

The invention claimed is:

1. A process for upgrading a C₄, C₅ or mixed stream thereof comprising normal alkane and isoalkane to motor fuel comprising the steps of:

- (a) separating the isoalkane from the normal alkane;
- (b) subjecting a portion of the separated normal alkane to dehydrogenation in a dehydrogenation unit to produce a normal alkene; and
- (c) feed the separated isoalkane and the normal alkene to an alkylation unit where the isoalkane is reacted with the normal alkene to form a branched alkane.

2. The process according to claim 1 wherein a portion of the separated normal alkane is subjected to skeletal isomerization to produce more isoalkane.

3. The process according to claim 1 wherein the effluent from the dehydrogenation is selectively hydrogenation under conditions to remove dienes.

4. An integrated process for upgrading a C₄, C₅ or mixed stream thereof comprising normal alkane and isoalkane to motor fuel comprising the steps of:

- (a) separating isoalkane from normal alkane;
- (b) isomerizing a portion of the separated normal alkane to isoalkane;
- (c) dehydrogenating a portion of the separated normal alkane to produce normal alkene; and
- (d) reacting the isoalkane and normal alkene under alkylating conditions to product isoalkane.

5. The process according to claim 4 wherein said separating is by fractional distillation.

6. The process according to claim 5 wherein said normal alkene from (c) is contacted with hydrogen under conditions to selectively hydrogenate dienes.

7. A process for the production of isooctane from a mixed C₄ alkane stream comprising the steps of:

- (a) separating isobutane from normal butane;
- (b) isomerizing a portion of the separated normal butane to isobutane;
- (c) dehydrogenating a portion of the separated normal butane to produce normal butenes;
- (d) selectively hydrogenating normal butenes from (c) under conditions to hydrogenate dienes; and

(e) reacting the isobutane and normal butenes under alkylating conditions to product isooctane.

8. A process for the production of isodecane from a mixed C₅ alkane stream comprising the steps of:

- (a) separating isopentane from normal pentane;
- (b) isomerizing a portion of the separated normal pentane to skeletal isomerization;
- (c) dehydrogenating a portion of the remainder of the separated normal pentane to produce normal pentenes;
- (d) selectively hydrogenating normal pentenes from (c) under conditions selectively hydrogenate dienes; and
- (e) reacting the isopentane with the normal pentenes under alkylating conditions to product isodecane.